Remarks

Responsive to the Office action of June 16, 2006, Applicants provide the following remarks. Reconsideration and allowance of the application is respectfully submitted.

Claim Rejections

Claim 11 was rejected because the phrases "a first of said movable rail and said stationary rail" and "said second of said movable rail and said stationary rail" were found to be unclear. In this regard, Applicants note that together the movable rail and the stationary rail make up two rails. Claim 11 recites "said sensor assembly being mounted to a first of said movable rail and said stationary rail," indicating that the sensor assembly is mounted to a first one of the two rails, i.e., either mounted to the movable rail or mounted to the stationary rail. In reciting "said second of said movable rail and said stationary rail not extending between said at least one magnet and said Hall device in either of said first position and said second position" claim 11 indicates that the second of the two rails, i.e., the rail that the sensor assembly is not mounted to, does not extend between the at least one magnet and the Hall device in either of the two positions. Applicant respectfully submits that the foregoing aspects of claim 11 would be readily understood by one having skill in the art. Withdrawal of the rejection is respectfully requested.

Claim 11 was also rejected because the phrase "said second of said movable rail and said stationary rail" lacks proper antecedent basis. Claim 11 has been amended to correct this error. Withdrawal of this rejection is respectfully requested.

Rejections Under 35 USC §112

Claims 2-8, 11-14, and 17-19 were rejected under 35 USC §112, first paragraph, for containing subject matter not sufficiently described in the specification. In making this rejection, the Examiner asserts that, while being below the magnet and the sensor, the rail appears to be between the magnet and the sensor. Applicants respectfully note that the independent claims use the phrase "extending between" and not merely "between." It is respectfully submitted that one having ordinary skill in the art would understand the phrase "extending between" to indicate that the rail is physically interposed between the sensor and the magnet, and not merely

superimposed, e.g., when viewed in a top view. Applicants respectfully submit that the subject application clearly teaches, e.g., in FIGS. 6A, 9, 10A, 10B, etc., embodiments in which a rail does not "extend between" the sensor and the magnet in either a first or a second position. Withdrawal of this rejection is respectfully requested.

Claims 2-5 and 8 were rejected under 35 USC §112, second paragraph, because the phrase "said activating member" lacks proper antecedent basis. Independent claim 3, upon which claims 2, 4, 5, and 8 ultimately depend, has been amended to recite "an activating member" thereby providing proper antecedent basis for the phrase "said activating member" occurring elsewhere in the rejected claims. The feature "an activating member" was originally recited in independent claim 1, but was inadvertently omitted when the limitations of claim 1 were incorporated into claim 3. As this feature was recited in an original claim, no new matter is believed entered by this amendment.

Rejections Under 35 USC §103

Claims 2-8, 11, 13-14, 17-19 were rejected under 35 USC §103(a) as being obvious over Becker et al. (6,095,555) in view of Birnbaum (4,236,093).

Independent claims 3, 6, 7, 11, and 18 have been amended herein to more clearly recite the relationship between the magnet and the magnetic field sensor. In particular, the independent claims have been amended to indicate that the magnetic field sensor is spaced apart from the magnet and that the magnetic field sensor includes a surface that is in an opposed facing relationship to the magnet. This aspect is shown, for example, in FIGS. 4, 6B, 9, 10A-B, and described, e.g., in paragraph [0042] of the application as published. The independent claims have further been amended to recite that the first and second outputs of the sensor correspond to the magnetic flux imparted perpendicularly to the surface of the magnetic field sensor that is in opposed facing relationship to the magnet, as described in paragraphs [0063]-[0064] of the published application and as shown, e.g., in FIGS. 10A-B. No new matter is believed to have been added by any of the amendments herein.

As amended, in independent claim 3 Applicants claim:

3. A non-contact position sensor comprising:

> a sensor assembly comprising at least one magnet, said magnet disposed adjacent a magnetic field sensor, said magnetic field sensor being spaced from said magnet and comprising a surface in opposed facing relationship to said magnet, said sensor assembly mounted to a rail of an automobile seat rail system; and
>
> an activating member;
>
> said magnetic field sensor providing a first output corresponding to a first amount of magnetic flux imparted perpendicularly to said surface of said magnetic field sensor when said activating member is in a first position relative to said sensor assembly; and a second output corresponding to a second amount of magnetic flux imparted perpendicularly to said surface of said magnetic field sensor when said activating member is in a second position relative to said sensor assembly, said first amount of magnetic flux being greater than said second amount of magnetic flux, and said activating member not extending between said magnet and said magnetic field sensor in either of said first and said second position.

As mentioned above, independent claims 6, 7, 11, and 18 have been similarly amended.

As discussed in the subject application, a position sensor as claimed may facilitate manufacturing, e.g., by providing a relatively wide tolerance in the vertical positioning of the magnetic field sensor relative to the magnet. The claimed configuration may also permit a broader range of tolerances in the air gap between the activating member and the sensor assembly. The aspects are shown and described, e.g., in FIG. 11, and in paragraphs [0066]-[0067], etc., of the application as published. Such aspects readily accommodate manufacturing tolerances. Additionally, the claimed position sensor configuration may eliminate features, such as pole pieces, etc., commonly utilized in magnetic position sensors, allowing a cost reduction and simplified manufacturing.

By contrast to amended independent claims 3, 6, 7, 11, and 18, Applicants respectfully submit that neither Becker et al. nor Birnbaum teach or suggest the claimed arrangement of the magnet and the magnetic field sensor. For example, as shown in FIGS. 4 and 5, Becker et al. teach an arrangement including a Hall effect device 70 and a permanent magnet 72 affixed to a support structure 75 such that the magnetic field of the permanent magnet 72 flows from the north pole 80 of the permanent magnet 72 through an air space 84, through the Hall effect device, and then through the support structure to the south pole 82 of the permanent magnet 72. In essence, the support structure 75 acts as a pole piece, directing the magnetic field of the

permanent magnet 72 through the Hall effect device 70 generally parallel to the north/south axis of the permanent magnet 72. See, e.g., Col. 3, l. 56 – col. 4, l. 19.

Consistent with the foregoing arrangement of Becker, "[w]hen the vehicle seat 12 is in the rearward position, the first flux density of the magnetic field of the magnet 72 is relatively low. The low first flux density of the magnetic field can be attributed to the fact that the magnetic field is conducted through the air space 84. As a result, the Hall effect device 70 has a low (or "off") condition with a corresponding low output signal when the vehicle seat 12 is in the rearward position." Col. 4, l. 12-19.

Becker further teaches "[w]hen the seat 12 is at or forward of the predetermined forward position, the air space 84 is occupied by the rail member 48 and a magnetic field of a second flux density, different than the first flux density, is conducted in a path between the north and south poles 80 and 82 of the magnet 72. The path of the magnetic field extends through the rail member 48 and the support structure 75. Thus, when the seat 12 is at or forward of the predetermined forward position, the magnetic field of the second flux density acts on the hall effect device 70. The magnetic field of the second flux density is indicated generally by the arrows shown in FIG. 5. " Col. 4, l. 32-43. As disclosed, when the seat is in the forward position, the path of the magnetic flux is from the north pole of the permanent magnet, through the seat rail and the Hall effect device, and then through the support structure to the south pole of the permanent magnet. In such an arrangement, the second flux density is relatively high, and the Hall effect device has a high, or "on", condition. See, e.g., col. 4, l. 44-54.

Consistent with the foregoing, as shown in FIGS. 4 and 5, and described in the associated text, the sensor arrangement taught by Becker switches between an on and an off condition based on the flux density through the Hall effect device generally parallel to the north/south axis of the permanent magnet. As such, Becker does not teach, or even suggest, first and second sensor outputs corresponding to the amount of flux imparted perpendicularly on the surface of the sensor that is in a facing opposed relationship to the magnet, as generally required by independent claims 3, 6, 7, 11, and 18.

Similar to Becker, Birnbaum also does not teach, or even suggest the claimed configuration. As shown and described, Birnbaum teaches an arrangement including a bi-stable ferromagnetic wire disposed between respective pole pieces. The bi-stable

ferromagnetic wire is disclosed as being responsive to reversals of magnetic flux between faces of the pole pieces. As it is understood, the magnetic flux between the faces of the pole pieces is generally parallel to a surface of the bi-stable ferromagnetic wire facing the magnet. As such, Birnbaum also does not teach, or even suggest, a magnetic field sensor providing respective first and second outputs corresponding to first and second amounts of magnetic flux imparted perpendicularly to a surface of the magnetic field sensor that is in an opposed facing relationship with the magnet.

In view of the foregoing remarks, clearly Becker et al. and Birnbaum fail to teach every aspect of amended independent claims 3, 6, 7, 11, and 18. Applicants, therefore, respectfully request that the rejection of claims 2-8, 11, 13-14, 17-19 be withdrawn upon consideration of the amendments and remarks herein.

Claim 12 was rejected under 35 USC §103(a) as being obvious over Becker et al. in view of Birnbaum an in further view of Tokunaga et al. (6,683,544). As discussed at length above, the combined teachings of Becker et al. and Birnbaum are insufficient to render independent claim 11, upon which claim 12 depends, obvious. The further consideration of Tokunaga et al. fails to remedy the deficiencies in the primary combination. Furthermore, Applicants note that Tokunaga et al. teach an arrangement including the use of a shielding plate 14 that is movable from a position between the magnet 7 and the Hall IC 4 and a position in which the shielding plate is removed from between the magnet 7 and the Hall IC 4. This arrangement is contrary to the requirements of independent claim 11, upon which claim 12 depends. Tokunaga et al., therefore, teach away from the claimed invention. One having skill in the art would not look to Tokunaga et al. to achieve the features and advantages of the claimed invention. As such, not only are the combined teachings of Becker et al., Birnbaum, and Tokunaga et al. insufficient to render claim 12, incorporating all of the limitations of claim 11, obvious, but furthermore, one having skill in the art would not look to Tokunaga et al. to achieve the claimed invention. Withdrawal of this rejection is respectfully requested.

Having overcome all of the outstanding objections and rejections, the subject application is believed to be in condition for allowance. Early allowance is respectfully requested.

In the event of any fee deficiencies, or that additional fees are payable, please charge our Deposit Account No. 50-2121 as necessary.

RESPECTFULLY SUBMITTED,

/Donald J. Perreault/

_____

Donald J. Perreault, Reg. # 40,126
Attorney for Applicants
Grossman, Tucker, Perreault & Pfleger, PLLC
55 South Commercial Street
Manchester, NH 03101
Phone: (603)668-6560; Fax: (603)668-2970